

Water@OneUSF

Mark Rains, Shawn Landry, James Mihelcic, Charles Jacoby
University of South Florida

OverFlow Seminar Series
April 15, 2025




PRESENTATION OUTLINE

- Mark Rains – Introductory Remarks
- USF Water Center – Shawn Landry
- USF College of Engineering – James Mihelcic
- USF College of Marine Science – Charles Jacoby
- Wrap up – Mark Rains

LIKE MANY OF YOU, WE'RE SCATTERED....

- 3 (Possibly 2) Campuses
- 5 (Or More) Colleges
 - College of Arts and Sciences
 - College of Engineering
 - College of Marine Science
 - Patel College of Global Sustainability
 - College of Public Health
 - College of the Environment?

USF Water Institute



Water Institute

UNIVERSITY OF SOUTH FLORIDA Water sustainability for complex socioecosystems

Home

About Us

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Data & Maps

News

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wateratlas

Building a comprehensive data resource that helps citizens and scientists alike make informed decisions



Welcome to the USF Water Institute

The USF Water Institute brings together faculty, students and stakeholders to conduct transdisciplinary research, provide innovative educational experiences, and facilitate public outreach efforts that promote science-based solutions to local and global water challenges.

Learn more about the Water Institute

Water Institute Websites

- WaterAtlas.org** - The Water Atlas website is a comprehensive data resource, eventually covering the entire state of Florida, that helps citizens and scientists alike make informed decisions concerning our vital water resources.
- SEACAR** - The Statewide Ecosystem Assessment of Coastal and Aquatic Resources (SEACAR) database website provide a repository for ecological indicator data, helping resource managers to assess the environmental health of Florida's Aquatic Preserves.
- Water-CAT** - A searchable database of Florida water monitoring activity that answers "who, what, where, when and why?" for water resource managers, researchers and citizens.
- Terra-CAT** - The FWC Species and Habitat Monitoring Programs Catalog is a searchable database of habitat and species monitoring activity for natural resource managers, researchers, and citizens.
- PlantAtlas.org** - The Plant Atlas website incorporates standards-based data-driven internet technology to disseminate plant information, images and distribution maps to the public.
- TampaTreeMap.org** - Mapping Tampa and USF's trees and growing a green future together. Tampa Tree Map is a web-based map database of trees within the City of Tampa and USF campus.
- ButterflyAtlas.org** - The Butterfly Atlas is an evolving partnership whose members are united by a common need to manage and disseminate information about butterfly life cycles, habitats and host plants, taxonomy, sightings, flight periods, and photographs.

Faculty and Staff

- Landry, Shawn** - Director, Research Associate Professor
- Rains, Kai** - Research Associate Professor
- Allyn, Jan** - Content Manager
- Baker, Jennifer** - Database Applications Developer
- Bornhorst, Keith** - Web Applications Developer
- Costley, Ruth** - Senior GIS Analyst
- Eilers, David** - Field Scientist
- Hammond, Rich** - Senior GIS Analyst
- Kershaw, Claude Juan-Luke** - Senior Database Applications Developer
- Scolaro, Jason** - Senior Database Applications Developer

See Affiliated Researchers

Students and Interns

- Bednar, Allison
- Mohacsi, Jayden
- Robinson, Stephanie

Former Staff and Students

Bandaru, Girija	Barnett, Tim	Bauer, Emily	Bowers, Robert
Budihal Prasad, Adhokshaja Achar	Cassiani, Ana Clara	Chandler, Ron	Cheatham Rhodes, Carolyn
Cooper, Bailey	Donerly, Barbara	Dudley, William	Dye, Daniel
Earnest, David	Etter, Chris	Foret, Tim	Gile, Michael
Gillum, Amanda	Griffin, Jim	Hamilton, Keir	Hilbert, Deborah
Jarrett, Mathew	Johnson, B. Terry	Kadiyala, Thejovathi	Karthik Jetty, Mohan
Khan, Amir	Kumar, Saurabh	Lamb, David	Leathers, Melanie
Lotero Lozano, Laura	Lott, Darline	Mathews, Wakhungu	Murali, Mrudhula
Neto, Michaela Barbara	Perry, Jackie	Rajput, Anuratna	Regis, Jamar
Rego, Emily	Rosbough, Robert	Scharfswardt, Andrew	Schultz, Alyssa
Sidhapur Lakshminarayan, Saandeep	Tawadros, Cassandra	Tolbert, Jessie	Tran, Vivian
Wilkins, Elizabeth	Williams, Cheran	Winter, Cody	Yu, Qiuyan

Overview of Projects

- Decision Support and Public Education
 - Water Atlas
 - SEACAR
 - Plant Atlas
 - Water-CAT
- Technical Services
 - Lake, Pond and Stream Assessments
 - Infrastructure Mapping and Technical Services
- Research
 - Urban Social-Ecological Systems Research
 - Urban Forest management and policy
 - Water and Wetland Studies

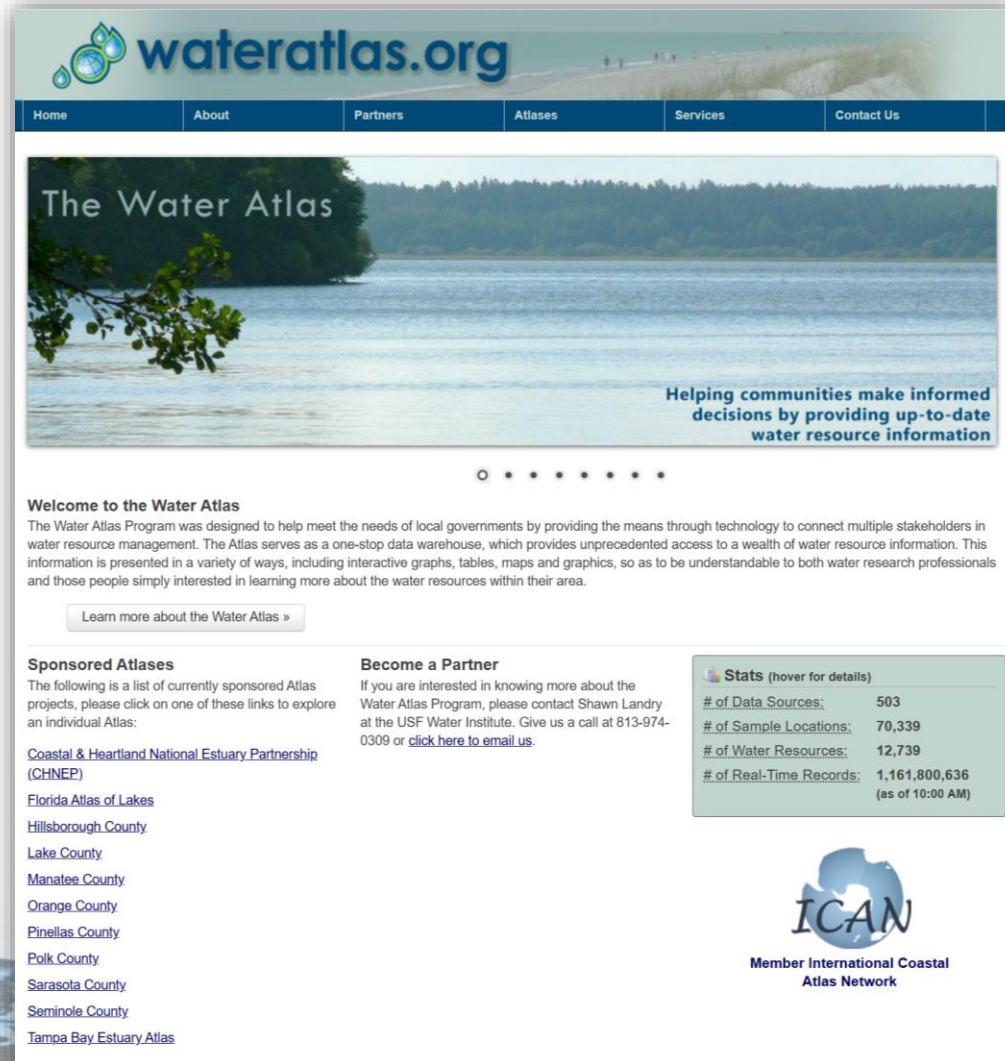


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WaterAtlas.org



The screenshot shows the WaterAtlas.org website. At the top is a navigation bar with links: Home, About, Partners, Atlases, Services, and Contact Us. Below the navigation bar is a large banner image of a lake with the text "The Water Atlas" and "Helping communities make informed decisions by providing up-to-date water resource information". Below the banner is a "Welcome to the Water Atlas" section with a paragraph about the program and a "Learn more about the Water Atlas »" button. To the left is a "Sponsored Atlases" section with a list of links: Coastal & Heartland National Estuary Partnership (CHNEP), Florida Atlas of Lakes, Hillsborough County, Lake County, Manatee County, Orange County, Pinellas County, Polk County, Sarasota County, Seminole County, and Tampa Bay Estuary Atlas. To the right is a "Become a Partner" section with contact information for Shawn Landry. Further right is a "Stats" box with a table of statistics.

Stats (hover for details)	
# of Data Sources:	503
# of Sample Locations:	70,339
# of Water Resources:	12,739
# of Real-Time Records:	1,161,800,636 (as of 10:00 AM)

Below the stats box is the ICAN logo and the text "Member International Coastal Atlas Network".

- Started in 1998
- Funded by local governments
- Supports surface water management requirements of Clean Water Act
- Used by water management professionals, researchers/students, and the public

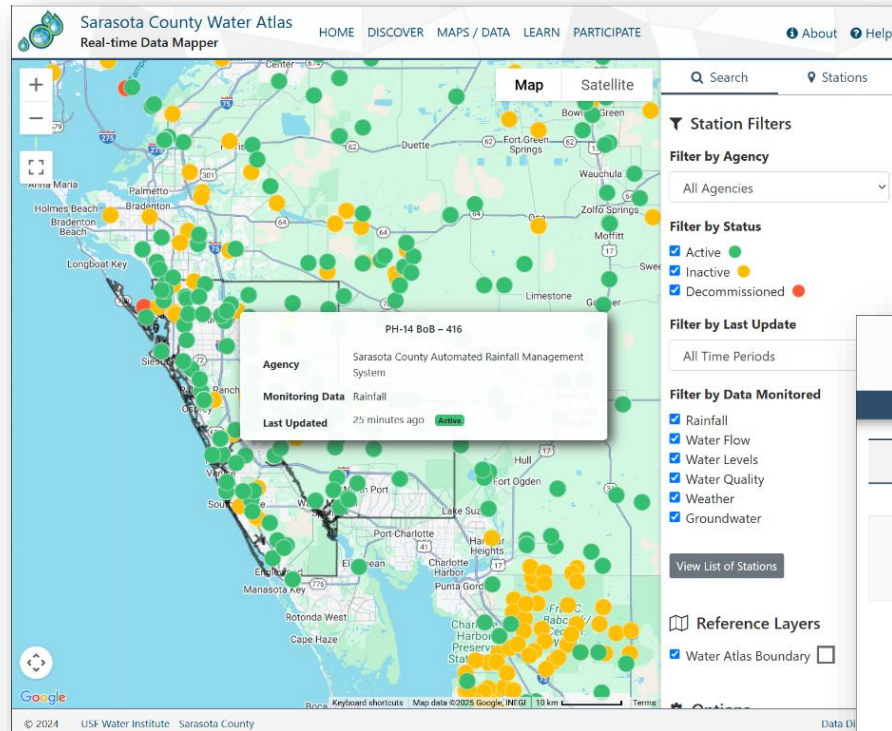
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WaterAtlas.org Data

- 504 data providers
- 12,739 water resources
- 72,961 sample locations
- @ 1.2 billion data samples



Sarasota County wateratlas

HOME DISCOVER MAPS / DATA LEARN PARTICIPATE

Data Download and Graphing

- 1 Select
- 2 Review / Refine
- 3 Download / Graph

Welcome to the Data Download and Graphing tool! This tool helps you easily download and visualize water quality data from sampling locations featured in the Water Atlas.

To get started, head to the **Select** page. Here, you can interact with an intuitive map interface to filter and choose specific sampling locations of interest. After making your selection, move on to the **Review/Refine** page, where you'll find a clear summary of available parameters and data collection periods for each location.

At this stage, you have the flexibility to further refine your selection by adjusting locations, parameters, or date ranges. Once your selections are finalized, simply choose whether you'd like to **Download** the data for offline analysis or **Graph** it directly for immediate visual insights.

Please note: The previous version of the Data Download and Graphing tool remains available for now but will be discontinued in the future. You can still [access the previous tool here](#).

Step 1: Select

Water Atlas Data Download

Interactive Map

Sampling Location Search

Green Download Button

Step 2: Review / Refine

Data Download and Graphing

Review and Refine Station Selection

View / Selection Parameters

Time Period of Interest

Download or Graph

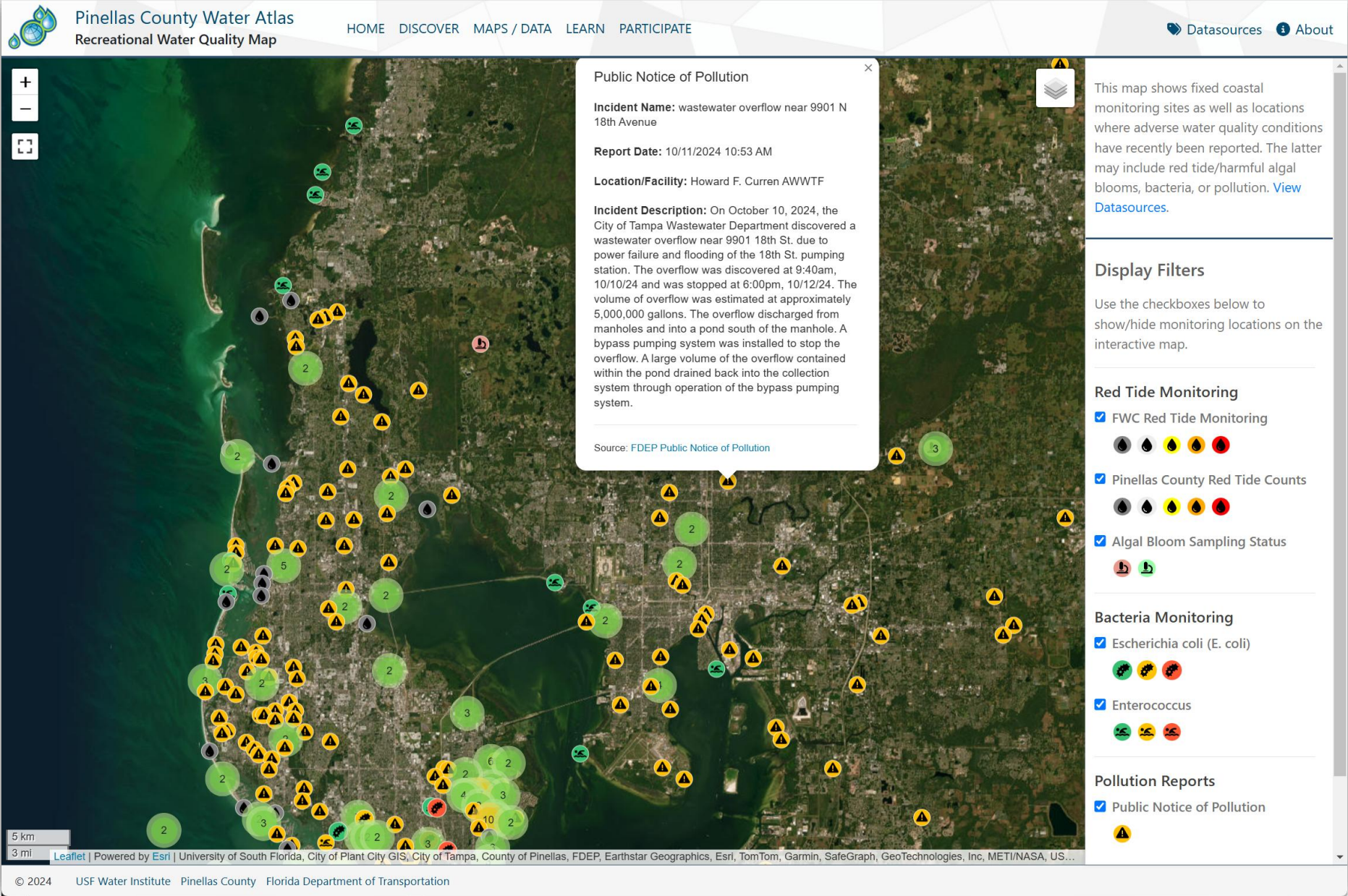
Step 3: Download / Graph

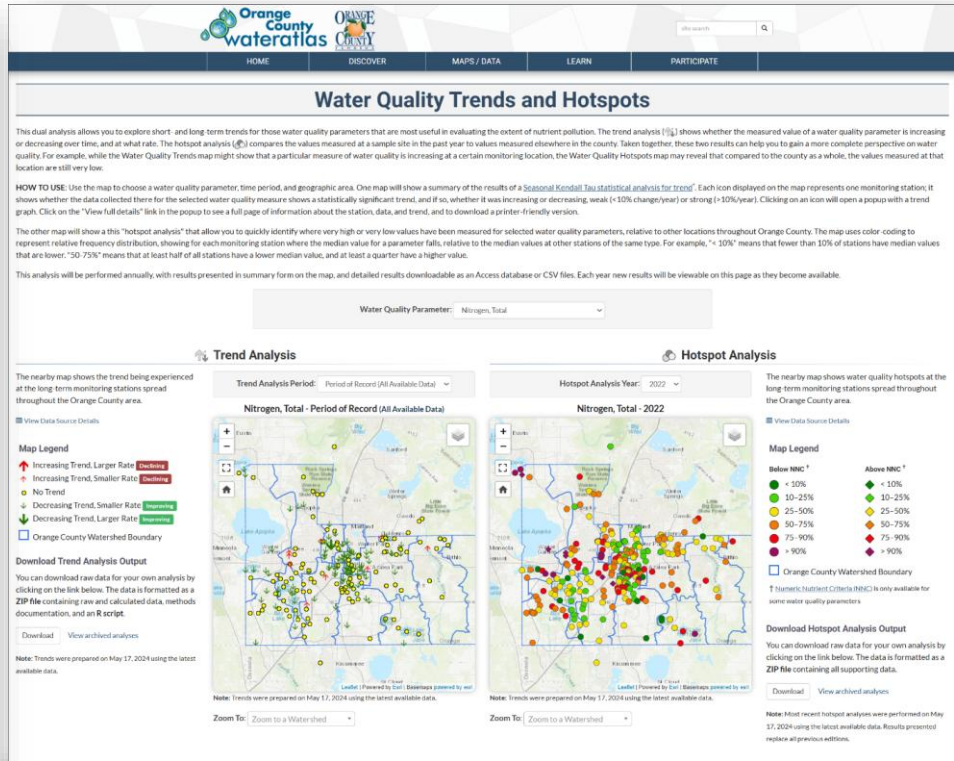
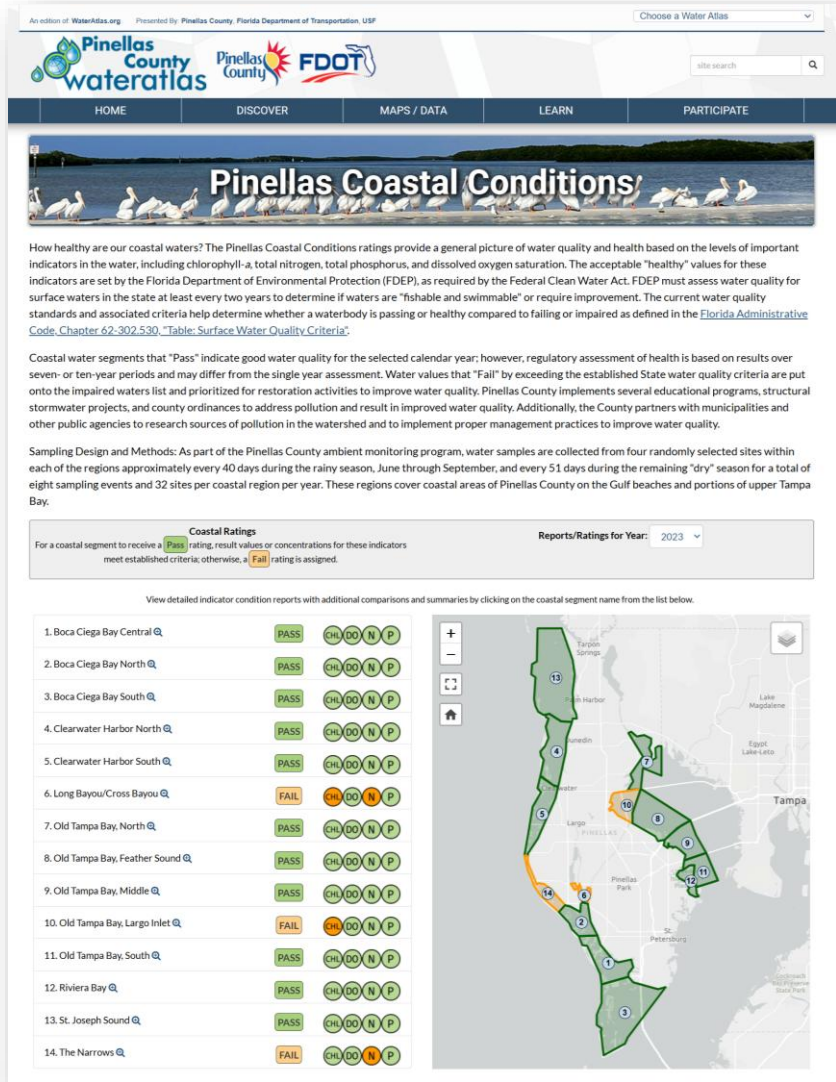
Graphing

Download Data

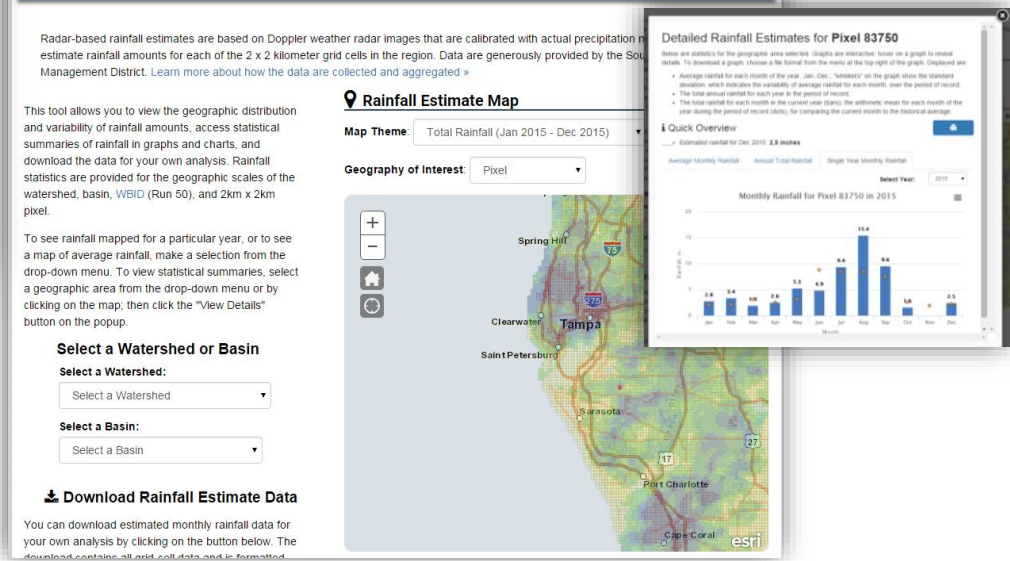
View Data as Interactive Graphs

Consolidation of Public Health Alerts

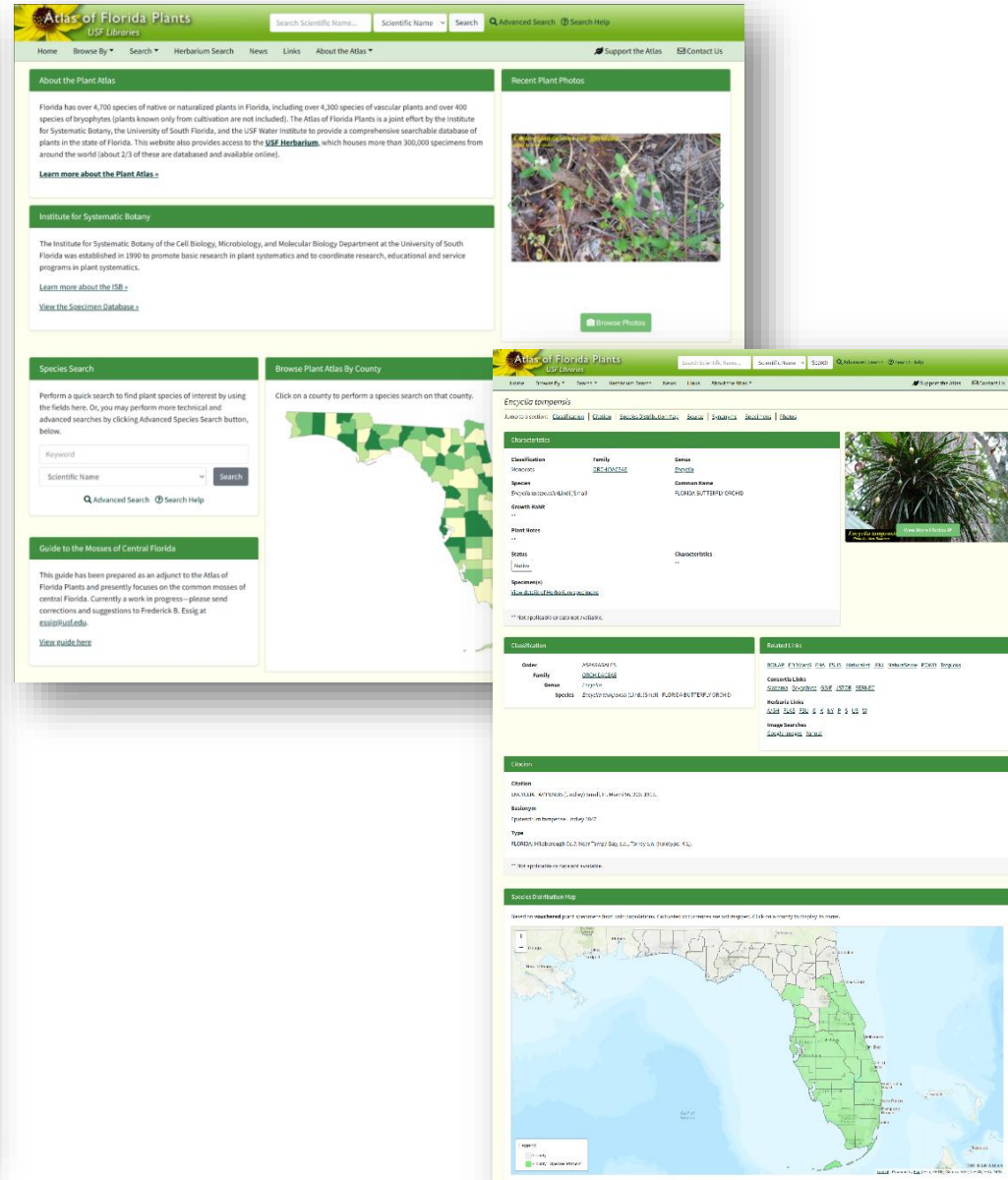
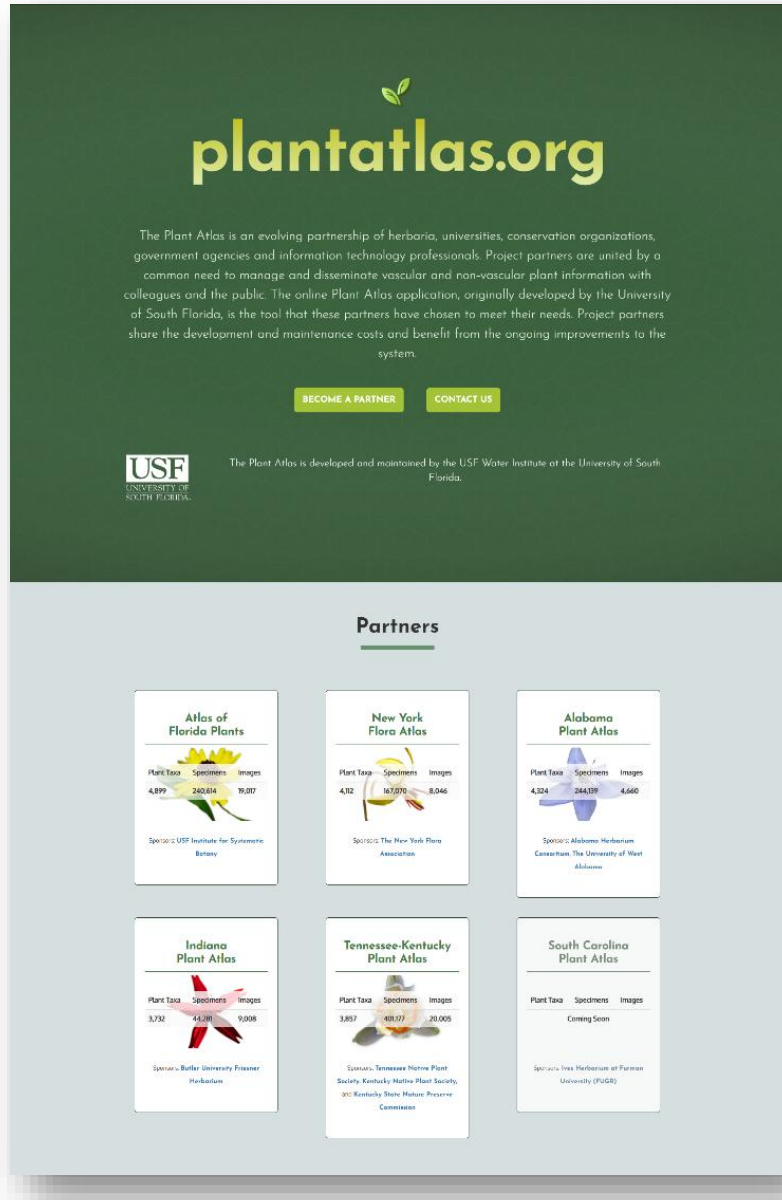




RADAR-BASED RAINFALL ESTIMATES



PlantAtlas.org



Florida Water Resource Monitoring Catalog: water-cat.org



- Conceived by the Florida Water Resource Monitoring Council
- Goal is to *improve knowledge of monitoring activities*
 - Online catalog of all water-resources monitoring activities
- Long-term support from FDEP

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Who, Where, What and Why of Environmental Monitoring

Water-CAT Spatial Viewer

Home Search Map Browse

Latitude: 26.150521 Longitude: -81.820274

Enter address

Layers Basemap

Advanced Search Tool

Features Selected: 24 Zoom Clear

- 260855081482001
Waterbody Monitored: Aquifer
Organization: United States Geological Survey
Station Name: C - 105
- 261001081475501
Waterbody Monitored: Aquifer
Organization: United States Geological Survey
Station Name: C - 355
- 261003081472901
Waterbody Monitored: Aquifer
Organization: United States Geological Survey
Station Name: C - 440
- 260925081475101
Waterbody Monitored: Aquifer
Organization: United States Geological Survey
Station Name: C - 1062

Search Results

StationID	Link to Full Details	Waterbody Monitored	Organization ID	Organization
260855081482001	View Full Details	Aquifer	USGS_NWIS	United States Geological Survey
261001081475501	View Full Details	Aquifer	USGS_NWIS	United States Geological Survey
261003081472901	View Full Details	Aquifer	USGS_NWIS	United States Geological Survey
260925081475101	View Full Details	Aquifer	USGS_NWIS	United States Geological Survey

Auto hide Export to CSV... Export to Txt... Export...

Water-CAT
The Florida Water Resource Monitoring Catalog

Log in

Home About Search Map FAQs Contact Browse

Home / Station List / Station Details

South of Mooring Line Dr. in Hurricane Harbor. MB4 Download Metadata

Station Details

Station ID	MB4
Name	South of Mooring Line Dr. in Hurricane Harbor.
Description	South of Mooring Line Dr. in Hurricane Harbor. South of Doctors Pass.
County	Collier
Drainage Basin	EVERGLADES-WEST COAST (03090204)
Water Resource	Gulf Of Mexico
Station Type	Estuary
Casing Diameter	
Casing Depth	
Total Depth	
Medium	
Status	Inferred Active

Location

Latitude	26.16866
Longitude	-81.80893
Proximity	Information is not reported regarding the relationship between the coordinates given and the sampling location
Location Collection Method	Unknown Method
XY Datum	World Geodetic Survey of 1984
Z Datum	
Land Surface Elevation (LSE)	
Method of LSE determination	

Site Map

Project(s)

Monitoring stations may be utilized by one or more projects. The following is a list of projects associated with this station and important project-level metadata such as project status, the water quality or biological parameters to be monitored, and the sampling frequency defined by project managers.

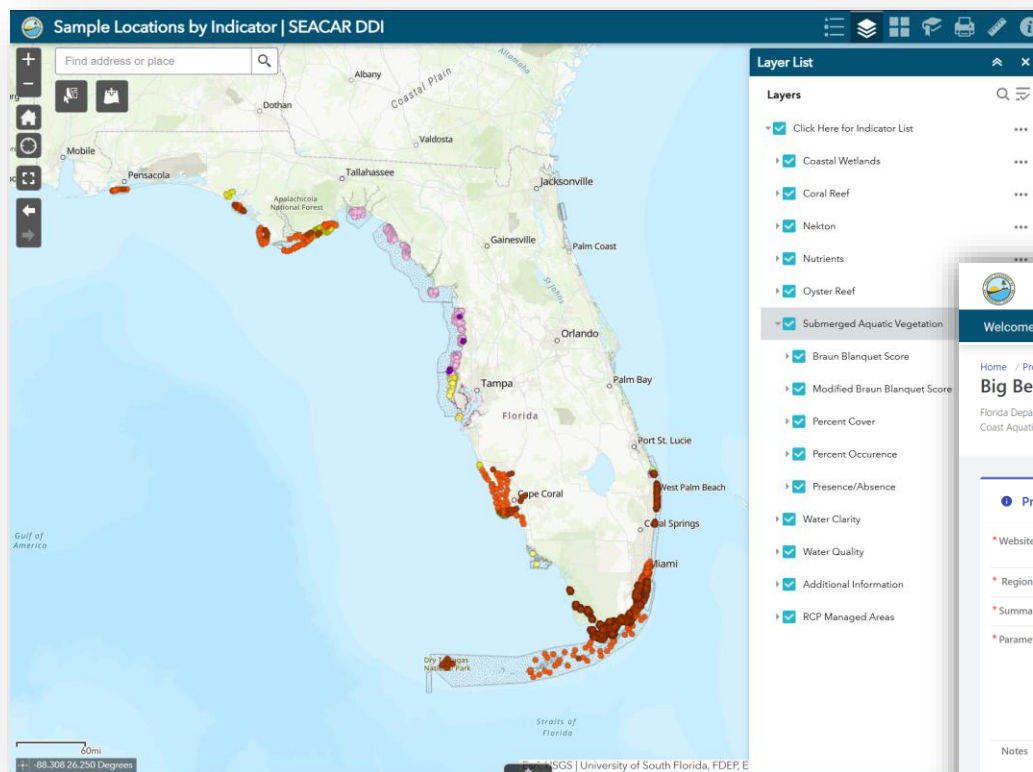
Note: This is one of possibly many stations monitored by a project. Each project defines the list of parameters monitored and this station may collect all of the parameters shown or only a subset.

156 organizations (so far)

1,265 monitoring projects

139,190 monitoring stations

Statewide Ecosystem Assessment of Coastal and Aquatic Resources (SEACAR)



<https://data.florida-seacar.org/>

SEACAR Data Discovery
Statewide Ecosystem Assessment of Coastal and Aquatic Resources

Welcome Home Monitoring Programs Program Matrix Data Discovery Interface Maps

Home / Programs / Program 560

Big Bend Seagrasses & Nature Coast Aquatic Preserves - Seagrass Monitoring 560

Florida Department of Environmental Protection (DEP); Office of Resilience and Coastal Protection (RCP); Big Bend Seagrasses Aquatic Preserves; University of Florida (Nature Coast Aquatic Preserve)

Back to List Open Program in DDI

Program Info

- Website**: <https://floridadep.gov/fco/aquatic-preserve/locations/big-bend-seagrasses-aquatic-preserve/>
- Region(s)**: NW
- Summary**: Seagrass Monitoring
- Parameters**: Seagrass and macroalgal percent cover by species, presence, density of bay scallops and sea urchins, epiphyte density on seagrass blades, bottom sediment type, Temperature (C), Salinity (ppt), Dissolved Oxygen (mg/L), and pH (SU) included since 2016. Depth (m), sechi (m) and canopy height (cm) are additional parameters recorded in the Nature Coast AP seagrass data.
- Notes**: SEACAR program ID 563 was deleted and is included as part of this one program. This program contains seagrass data for three Aquatic Preserves: Big Bend Seagrasses and St. Martins Marsh AP's - data compiled in BBSAP files; and Nature Coast AP - data compiled in NCAP files.
- Application**: To collect baseline conditions within Big Bend Seagrasses Aquatic Preserve, St. Martins Marsh Aquatic Preserve and Nature Coast Aquatic Preserve for post-impact comparisons and to help address management issues of the resource.
- Publications**: Reports: Big Bend Seagrasses Aquatic Preserves Annual Seagrass Monitoring Report and FWC SIMM report chapters: Northern Big Bend; Southern Big Bend; Suwannee Sound, Cedar Keys, and Waccasassa Bay; and Springs Coast.
- Start**: 1997
- End**: Current
- Frequency**: Annual
- Method**: Four randomly placed 1-m² quadrats at each site are assessed using percent coverage method in nine geographic areas (FDEP methods). Additional documented observations via Big Bend Seagrasses Aquatic Preserve

Program Extent

Map of Sample Locations

Export Standardized Data

Habitat(s) : Indicator(s)	Last Updated	File Down
Submerged Aquatic Vegetation : Percent Cover (by species)	06/22/22 04:22 PM	(1)
Geodatabase File	N/A	(0)
DIP Document	N/A	(0)

Office of Resilience and Coastal Protection Managed Areas

Contacts

- Timothy Jones**
Timothy.W.Jones@dep.state.fl.us
- Trisha Green**
Environmental Specialist
Trisha.Green@dep.state.fl.us
- Morgan Edwards**
Biologist - Nature Coast Aquatic Preserve
morgan18@ufl.edu
- Jamie Hammond**
jmh1987@ufl.edu
- Katherine Suchanec**



UNIVERSITY of
SOUTH FLORIDA
College of Engineering

≈ ten years ago we received an EPA Grant to establish the Center for Reinventing Aging Infrastructure for Nutrient Management –

James Mihelcic - Director

- develop science behind new technology
- demonstrate new technological innovations originating from the new science to provide knowledge for community members, policy makers, regulators, design engineers, and regulated entities.
- Integrate our innovations with sustainability assessments and systems-based approaches applicable to the management of point and diffuse sources of nutrients, over different scales



Long-term demonstration of stormwater bioretention system to remove nitrogen in under-served community

(Drs. Sarina Ergas & James Mihelcic)



Without Plants

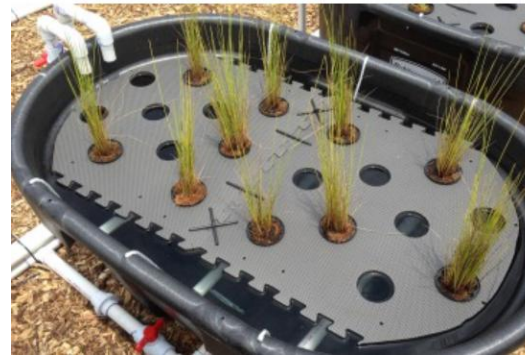
With Plants

Evaluation of Floating Treatment Wetlands (FTW) with Biochar and Different Macrophytes for Nutrient Removal from Urban Stormwater Runoff



Setting up of FTW systems at Aaran's

- pond
- What key factors and processes affect nutrient removal in FTWs?
- Does biochar improve FTW nutrient removal and microbial diversity?
- How does plant species affect performance?
- How do nutrient loading rates and hydraulic retention times affect performance?



Mesocosm study
(from Spangler et al.,
2019)

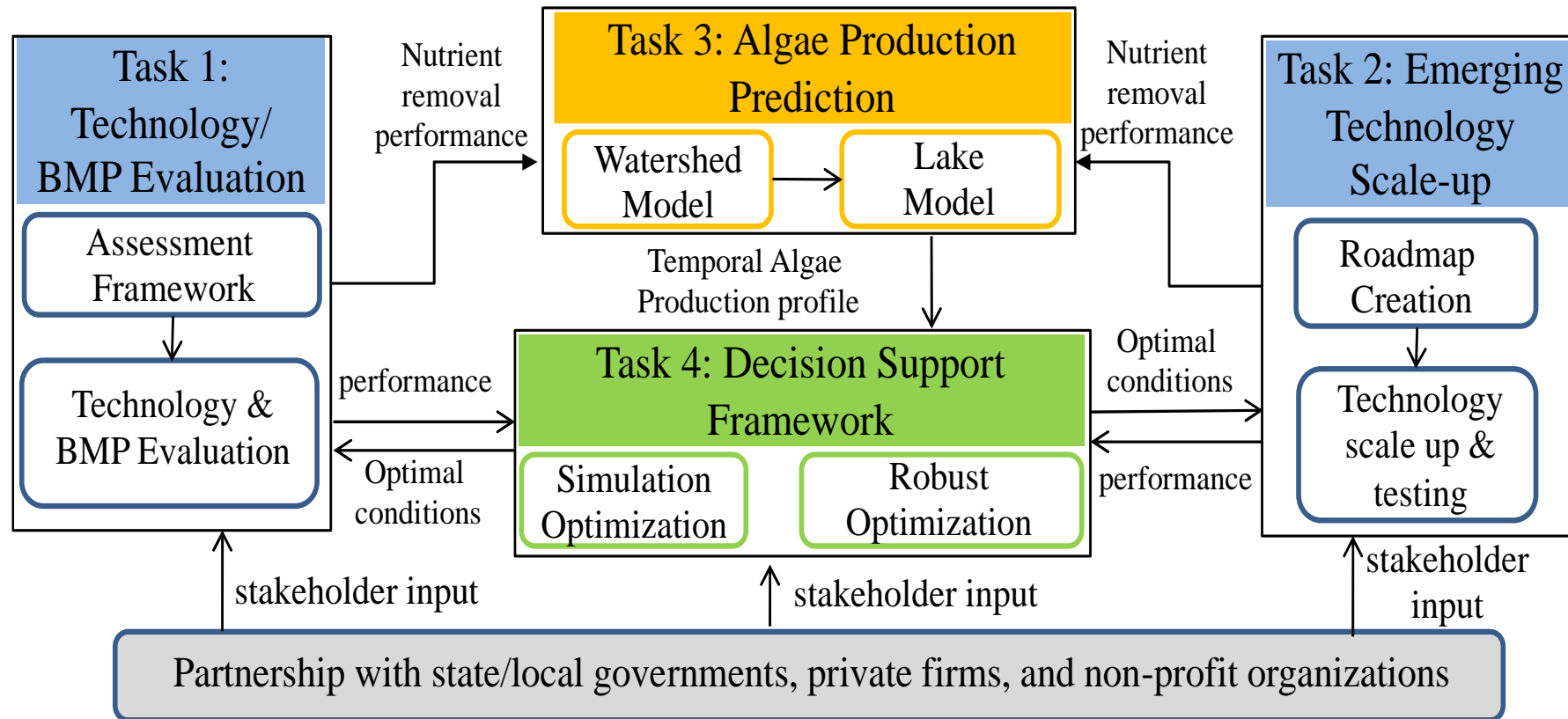
Treatment	Plants	Media
1	None	Coir + biochar
2	None	Coir
3	Golden canna	Coir + biochar
4	Golden canna	Coir
5	Fakahatchee grass	Coir + biochar
6	Canna + Fakahatchee	Coir + biochar

FTW experimental program for
mesocosm study (closed tank
setup)



Temporal and Spatial Optimization of Existing and Emerging Nutrient Management Technologies and Practices for Control of Harmful Algal Blooms

- **Team:** Zhang, Q. (PI), Arias, M., Charkhgard, H., Ergas, S., Mihelcic, J., Nachabe, M., Rains, M. (Co-PIs)
- **Goal:** Optimize the implementation of nutrient treatment technologies and management practices
 - What, where and when?



Integrating Modeling Tools & Observations in the Caloosahatchee, Lake Okeechobee, and St. Lucie Estuary for Prediction & Management of Harmful Algal Blooms (CLOSE-HABs)

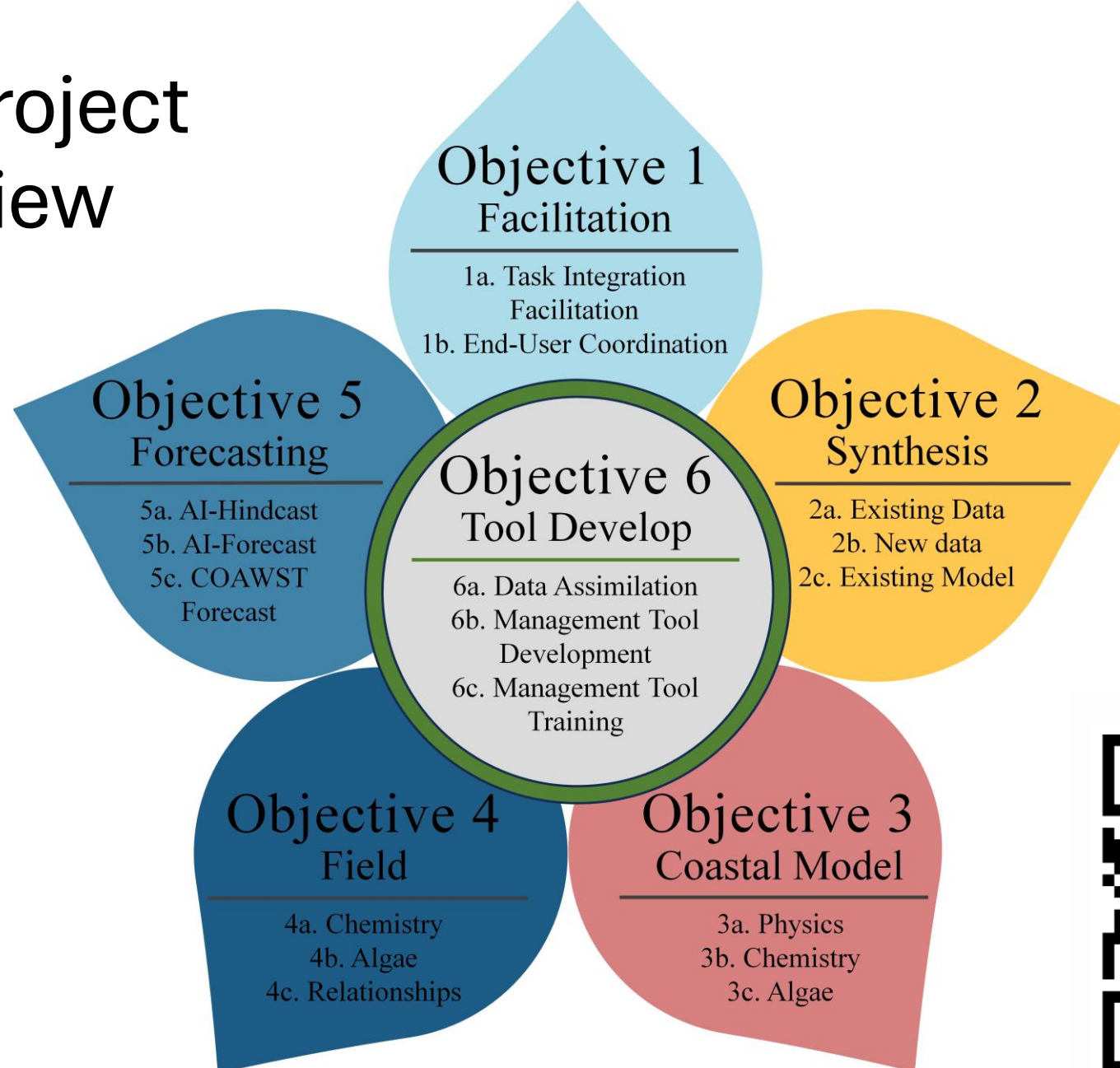
PI: Mauricio Arias

USF Co-PI: Qiong Zhang

Non-USF Investigators: David Kaplan, Maitaine Olabarrieta, Ed Philips, Elise Morrison, Cassandra Armstrong



SLEW Project Overview



<https://www.usf.edu/engineering/cee/research/algal-bloom-research/index.aspx>



Blue Green Action Platform

**Bridging Communities Upstream and Downstream for Nitrogen Management:
An inclusive, people-centered platform and capacity-building initiative**

Dr. Maya Trotz



BlueGAP humanizes nitrogen pollution by providing stories, trusted data, consultation, and resources to benefit those most impacted by nitrogen pollution.

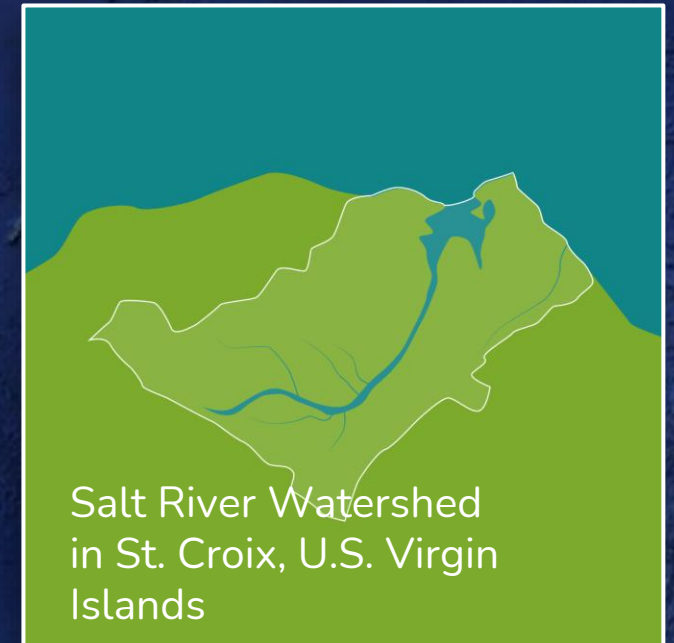


Stories



Data

Action





RESILIENT FLORIDA PROGRAM

PLANNING GRANTS

To assist local governments with Vulnerability Assessments, Peril of Flood Comprehensive Plan Amendments

STATEWIDE FLOODING AND SEA LEVEL RISE RESILIENCE PLAN

To assist local governments and eligible entities in implementing projects that address flooding and sea level rise

STATEWIDE DATA SET AND ASSESSMENT

Collection of local vulnerability assessments and data to assist in creating a Statewide Flooding and Sea Level Rise Assessment

REGIONAL RESILIENCE ENTITIES

Technical Support, develop project applications for members and multijurisdictional collaboration

Up-to-date, realistic, and consistent standards and projections of compound flooding



Workgroups



Sea Level Change
Workgroup

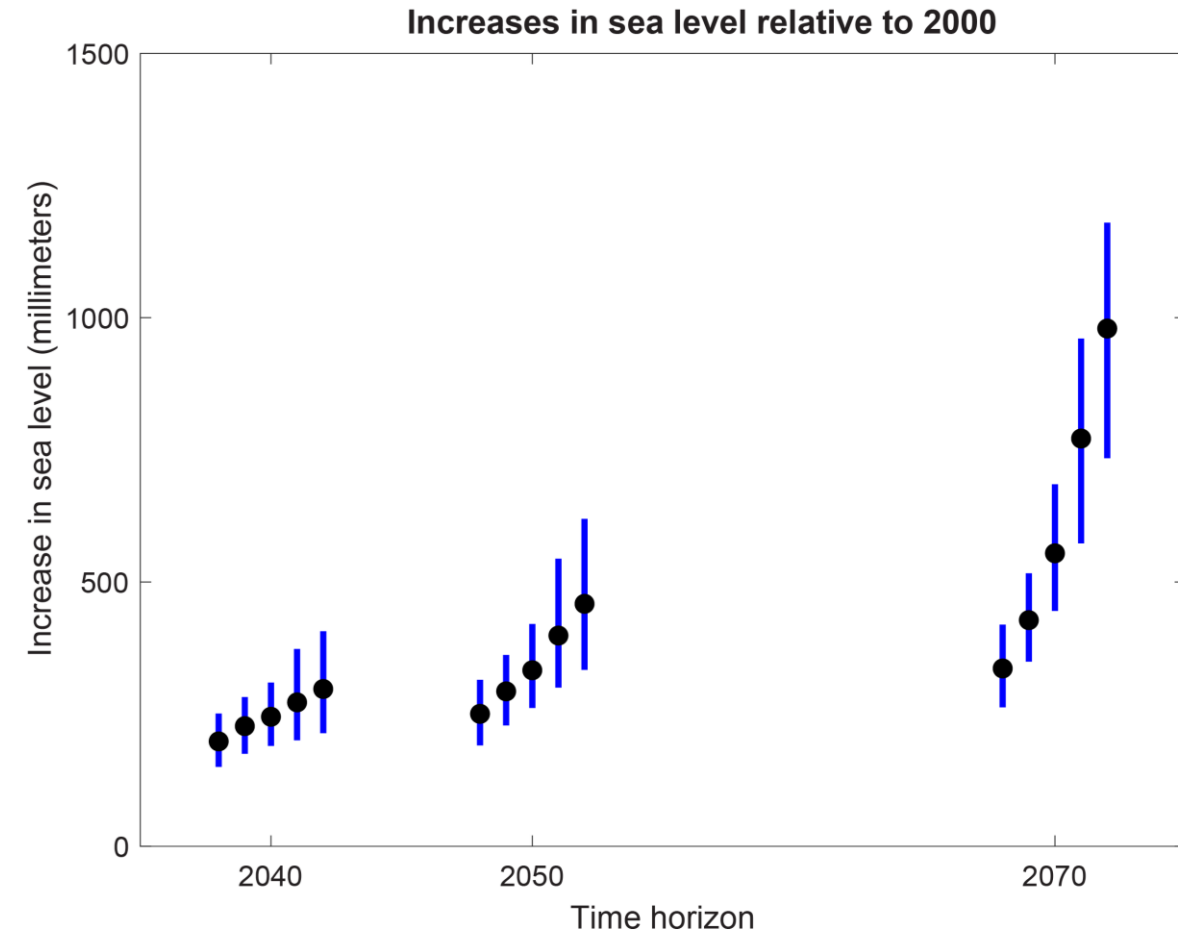
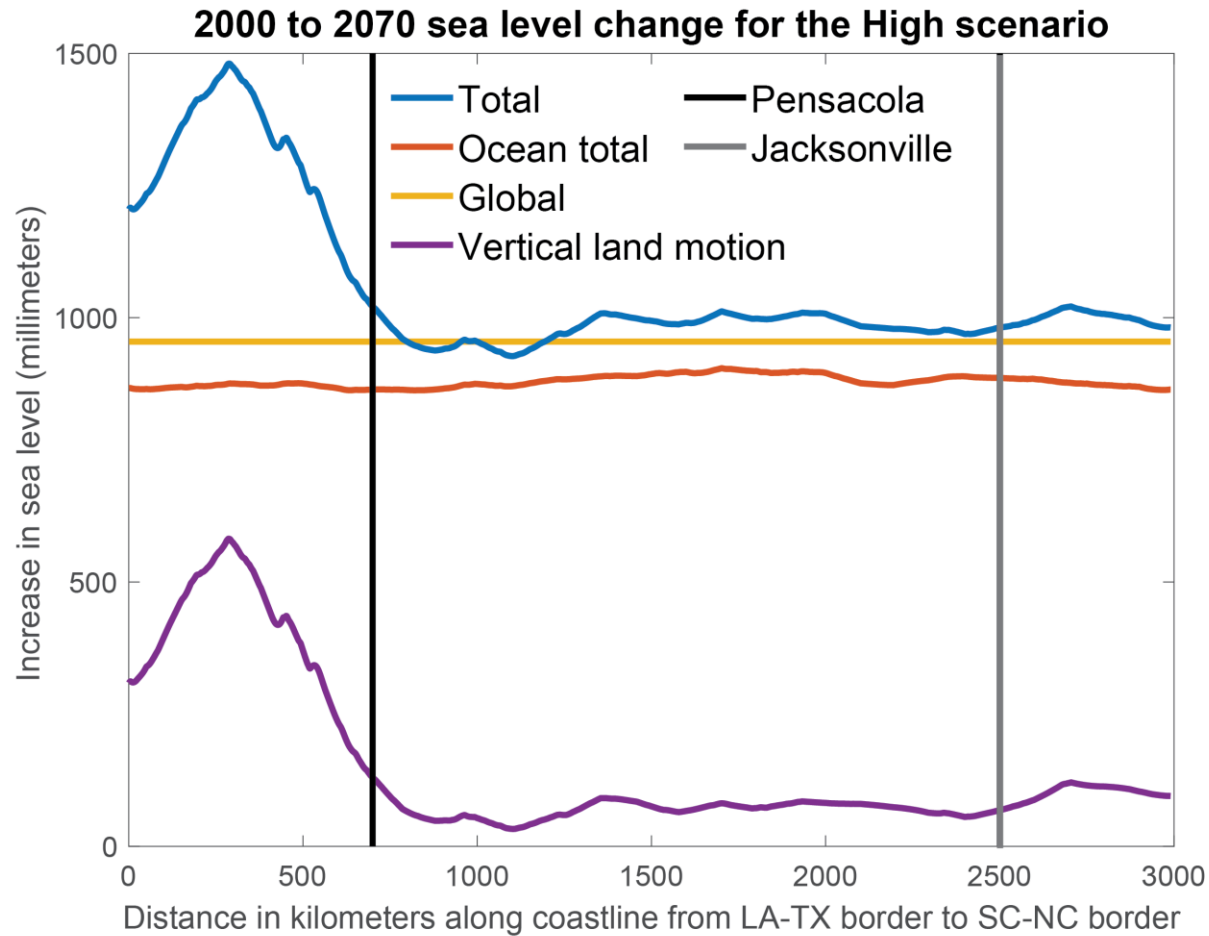


Rainfall
Workgroup



Comprehensive Modeling
Workgroup

Changing sea level



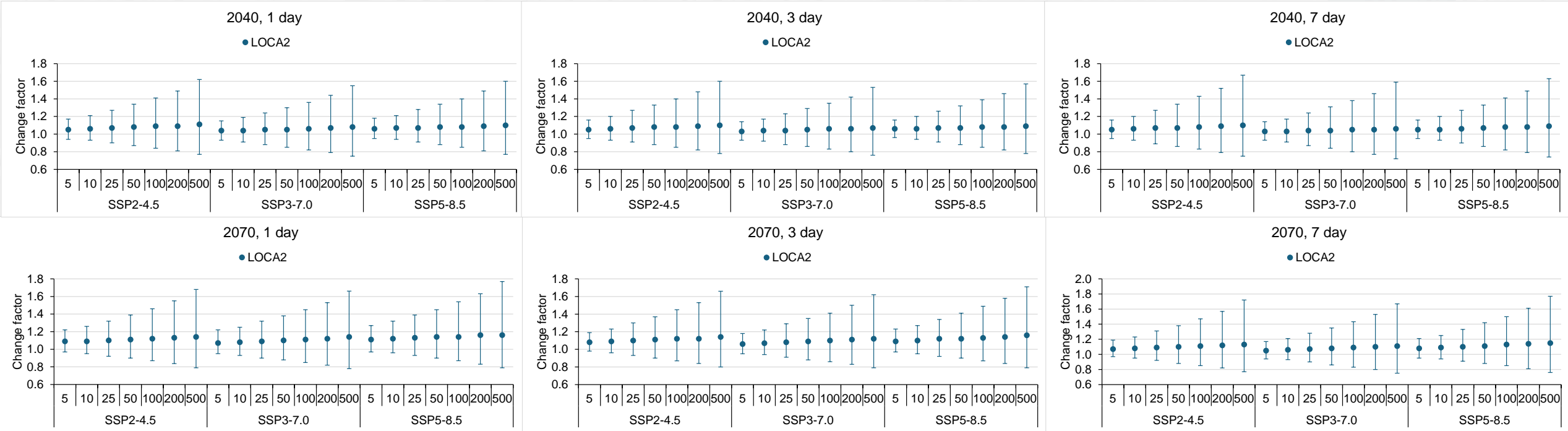
Changing sea level

Table 2: Exceedance probabilities for Florida projected to 2100 with emissions scenarios used in the Federal Task Force Report

Global mean sea level rise scenario (rise 2000–2100)	Predicted increase in global mean surface air temperature				
	1.5°C	2.0°C	3.0°C	4.0°C	5.0°C
Low (0.3 m)	92%	98%	>99%	>99%	>99%
Intermediate Low (0.5 m)	37%	50%	82%	97%	>99%
Intermediate (1.0 m)	<1%	2%	5%	10%	23%
Intermediate high (1.5 m)	<1%	<1%	<1%	1%	2%
High (2.0 m)	<1%	<1%	<1%	<1%	<1%

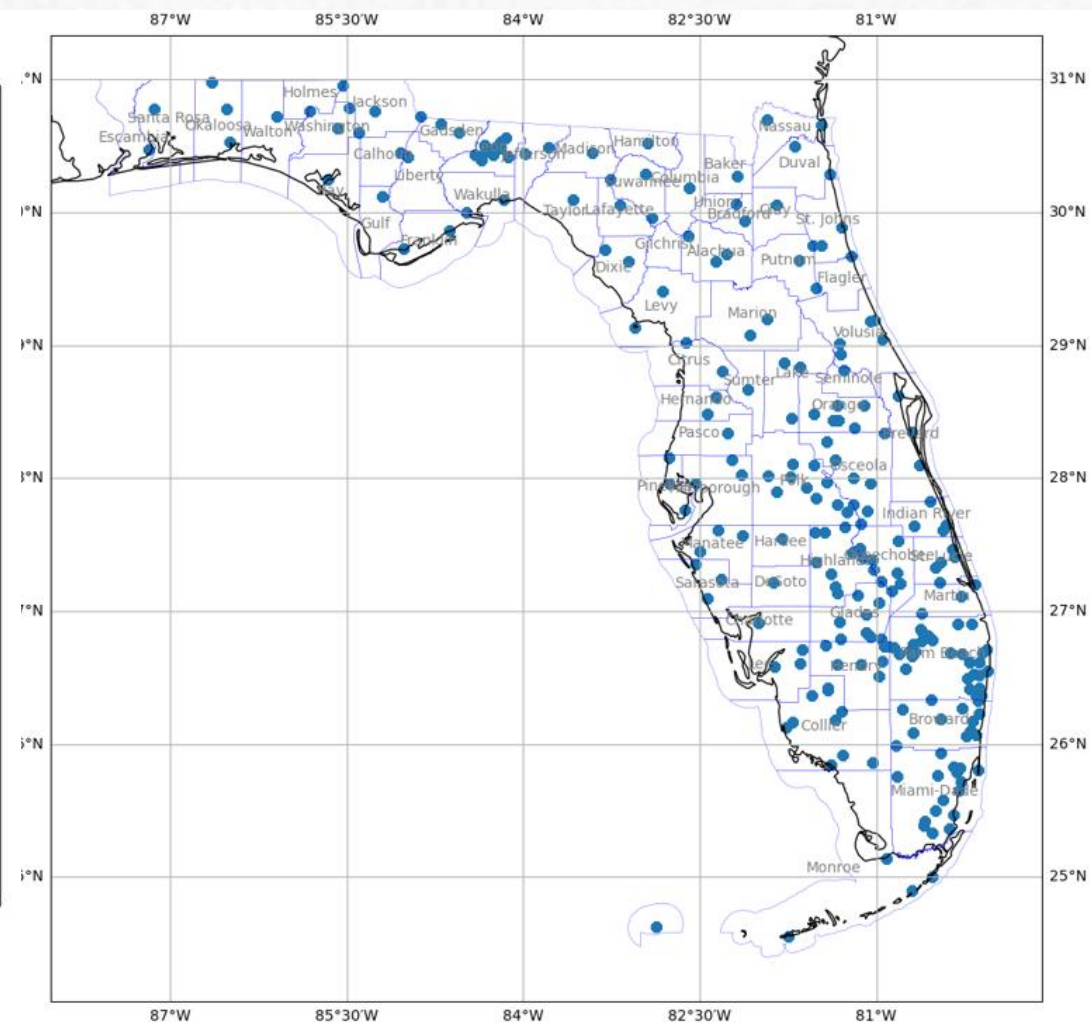
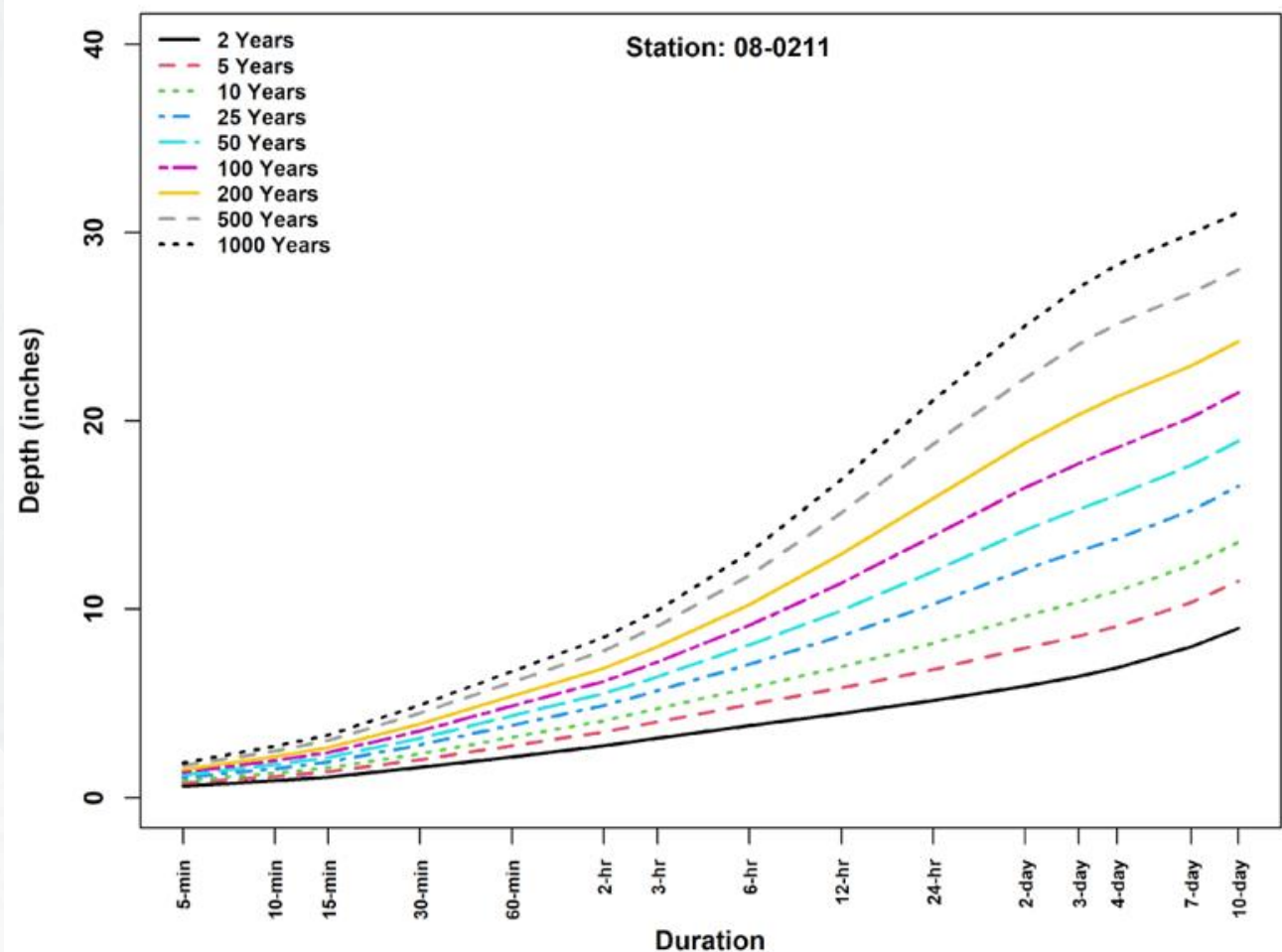
Changing precipitation

Median, 17th & 83rd percentiles

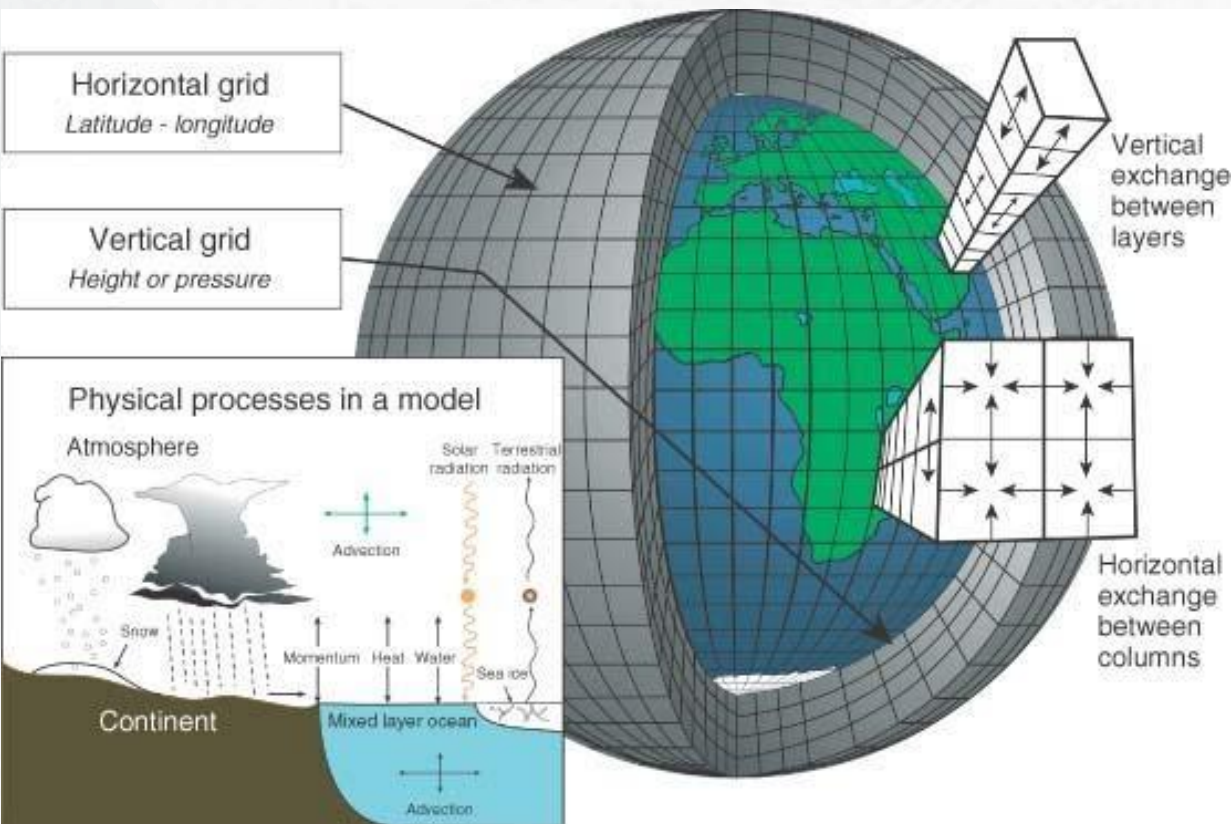


Changing precipitation

Depth-Duration Curve

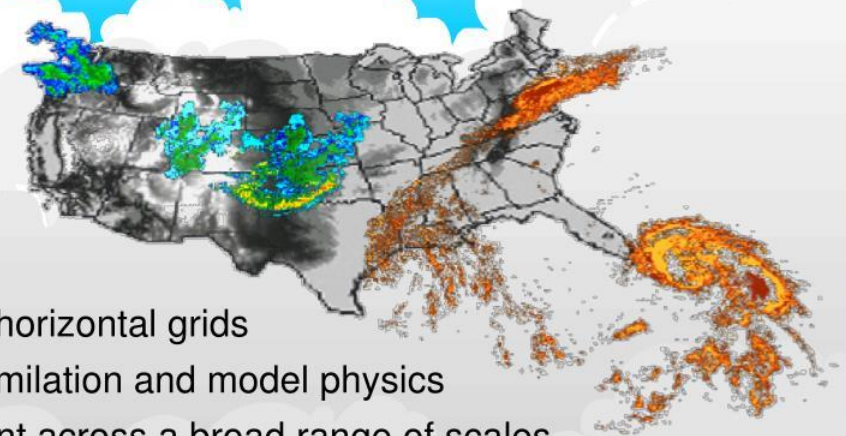


Higher resolution models



Weather Research and Forecast (WRF) Model

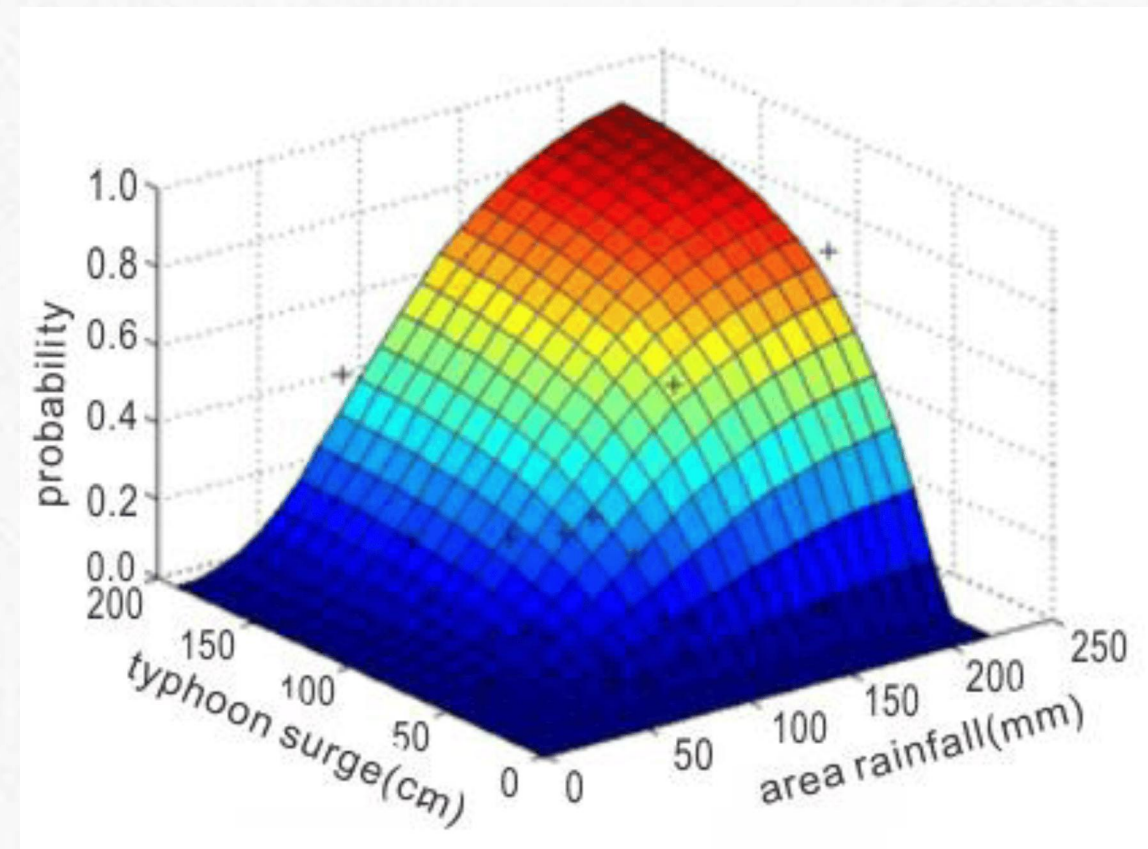
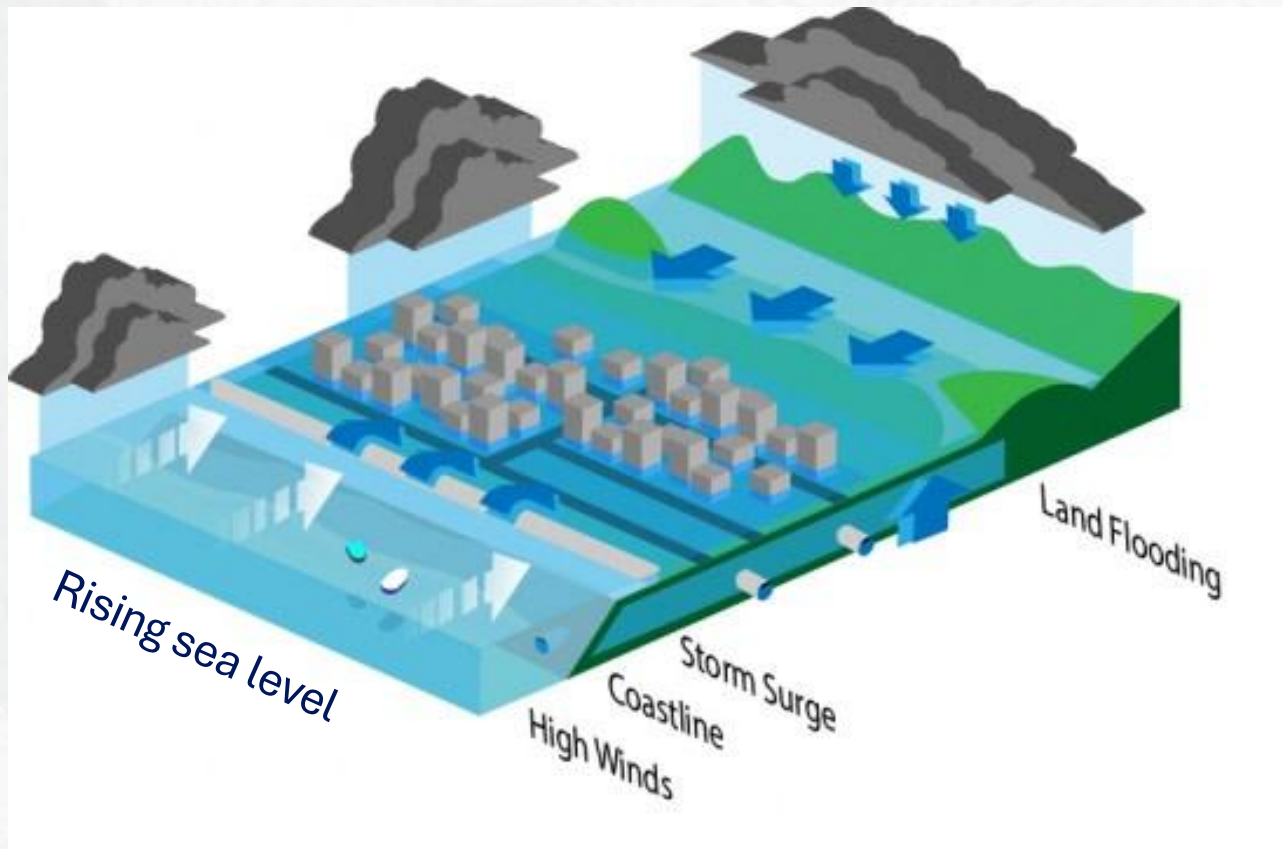
- ➔ Develop an advanced mesoscale forecast and assimilation system
- ➔ Promote closer ties between research and operations



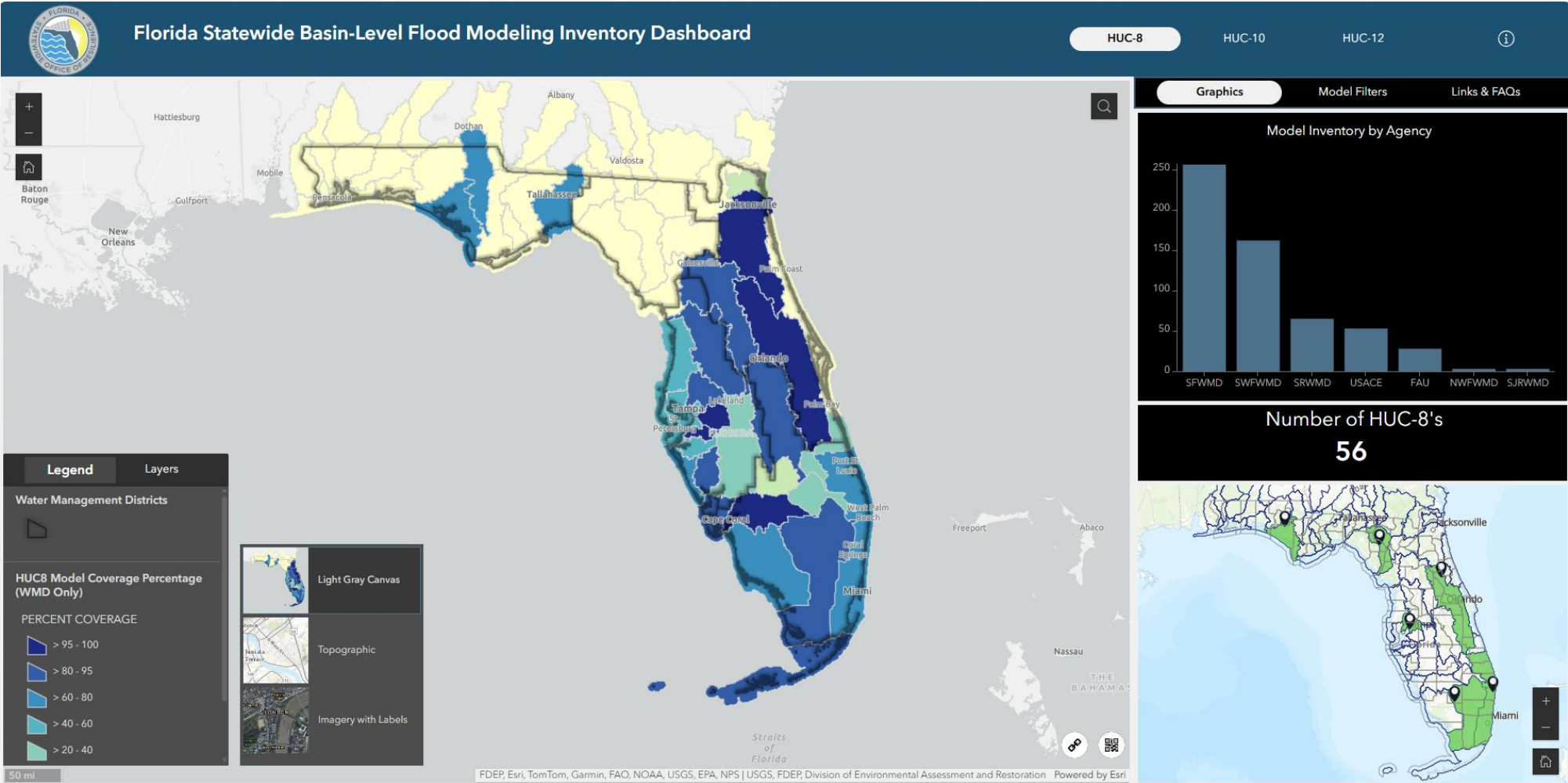
Research:

Design for 1-10 km horizontal grids
Advanced data assimilation and model physics
Accurate and efficient across a broad range of scales
Well-suited for both research and operations
Community model support

Compound flooding

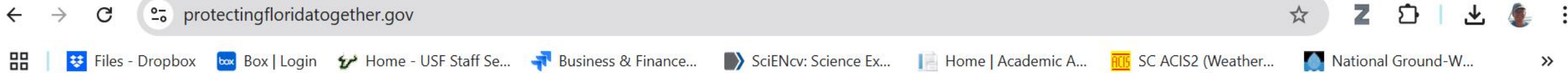


Inventory of models





RESILIENT FLORIDA PROGRAM GRANTS PROGRAMS



State Action ▼

Resources ▼

Grants

Search 🔍

Water Quality Status ▼

\$1.6B over 4 years



RESILIENT FLORIDA - PLANNING GRANTS

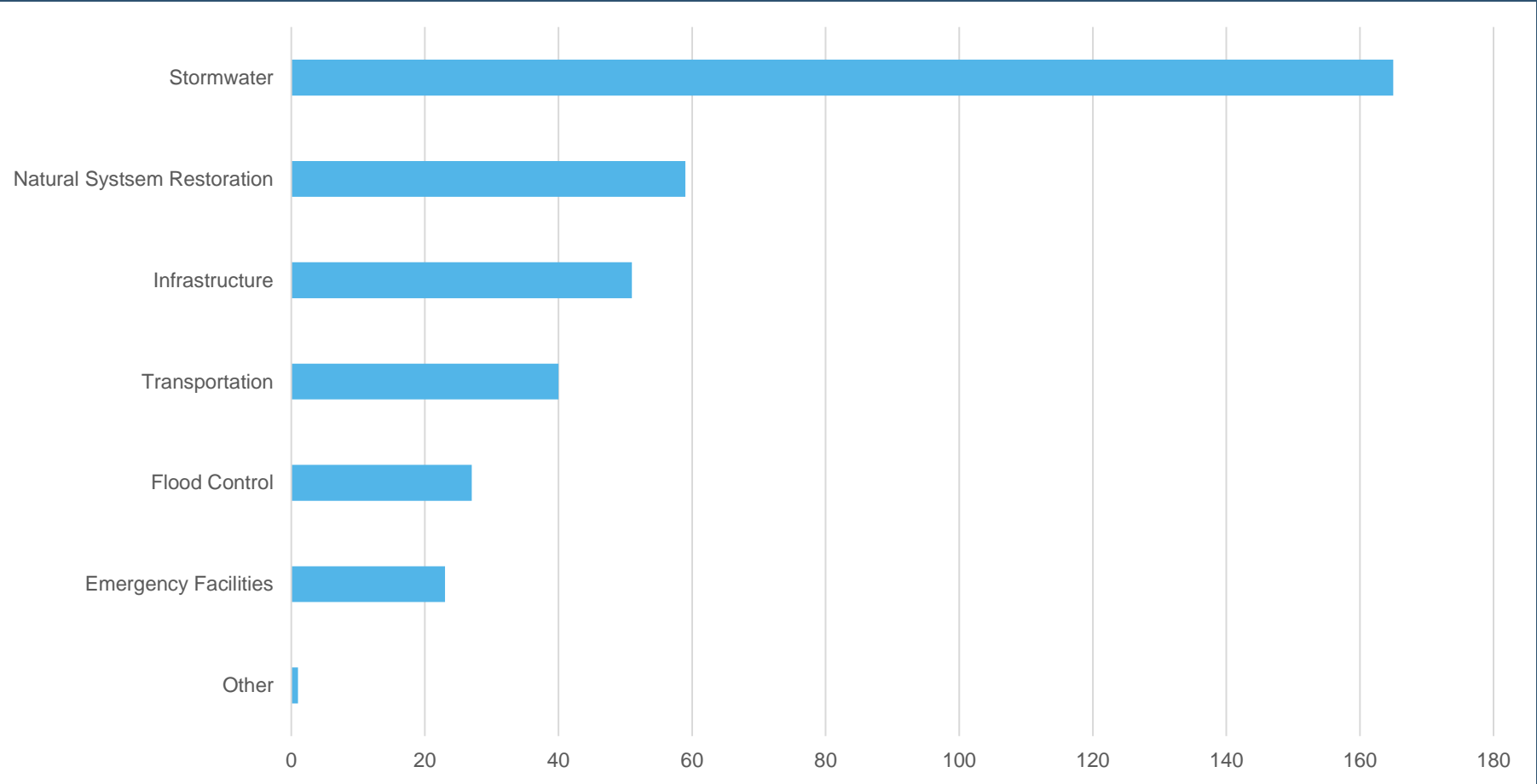


RESILIENT FLORIDA - IMPLEMENTATION GRANTS



IMPLEMENTATION GRANTS

PROJECT TYPE



Nigel Cook